

### ABSTRACT OF THE DISCLOSURE

Methods are provided for detecting chemical, biological and/or nuclear attacks in large areas such as cities, states and nations. The system protects the public before significant exposure occurs, utilizing a preventive approach rather than a purely reactive approach. Modeling is conducted to selectively position sensors for the on-going collection of real-time detection data, such as contaminant types and concentrations, weather conditions, terrain data, dispersion data and the like. The detection data is compared to background data and modeled data to detect unsafe contaminant levels and immediately activate a response system. The integrated modeling and simulation component may function to interface with real-time data from the sensors providing integrated real-time plume depiction, prediction, and verification, as well as real-time response and mitigation. This is testable and serves as an advanced redundant scientific control. The response system may implement a variety of protective measures, including, but not limited to, medical response procedures for emergency rooms and hospitals, warning alarms, instructions for personal protection, sealing of buildings, introduction of positive pressure in buildings, and introduction of clean air in confined spaces. An IT infrastructure may connect the modeling, detection and response components.